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Clint Hardy
Daviess County Extension Office

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Seed Size and Crop Yield in Kentucky in 2025

Dr. Dennis B. Egli, UK Professor Emeritus of Plant Physiology in the UK Martin Gatton College of Agriculture, wrote the following article related to the growing season and crop outcomes.

The year 2025 might turn out to be the year of the 'small seeds'. Many corn and soybean fields across the state resulted in seeds that are smaller than normal. The explanation for this phenomenon lies in the interaction between a change in weather and the stage of crop development in which the change in weather occurred. This year started out as a good year. Rainfall in Kentucky from January through July was above normal, delaying planting, but raising hopes for good yields. The yield hope bottom dropped out when it stopped raining in August. This August was the driest on record. The total rainfall for the month was 1.29 inches, 2.5 inches below normal. September was better, but there were still areas in the state with below normal rainfall. If the dry weather hit when corn and soybean crops were filling their seeds, the seeds would be smaller than normal. Dividing yield into its two components – the number of seeds per acre and the weight per seed helps us understand this relationship. The number of seeds the crop produces is determined by the productivity of the environment during flowering and seed set. Growth stage R1 to R5/R6 in soybean and roughly 20 days before and after silking in corn. A

highly productive environment, no water stress or other limitations, during this critical period will produce a large number of seeds, while stress will reduce seed number by interfering with pollination or causing extra abortion of flowers and immature seeds. The productivity of the environment during the seed-filling period will affect final seed size. A highly productive environment, optimum temperatures, and soil moisture, will produce large seeds. Water stress during seed filling will accelerate leaf senescence, shorten the seed-filling period, and reduce seed size. This happened in areas of many fields in Kentucky that ran out of water during seed filling.

A potentially high yield, assuming seed set occurred before the water ran out, was not realized because of stress during seed filling. The effect of the weather on yield is all about timing. What the crop is doing when it's stressed will determine its effect on yield. The crop is most resilient to stress during vegetative growth. Reducing vegetative growth will not affect yield if the stress is relieved, such as from rain, and the crop recovers to produce enough leaves to completely cover the ground by flowering. Stress during flowering and seed set will reduce seed number, which can have a catastrophic effect on yield.

The crop can compensate for the reduction in seed number by increasing seed size if there is no stress during seed filling. Unfortunately, there is a limit to the increase in seed size, so the increase in size may not be enough to offset the reduction in seed number and prevent yield loss completely.

Unfortunately, there is no limit on reductions in seed size. A limit on the upside, but not on the down! Isn’t that the way it always is? You can vary the timing of the critical stages by planting varieties/hybrids that differ in maturity or by varying planting dates. Short periods of

stress may not hit the critical stages of the entire crop if the critical stages occur at different times. This approach lets you exploit the time by stress interaction to build a little stress resilience into your crop. Of course, this approach might cost you yield in years when a single variety/hybrid - planting date combination is stress free and hits the yield jackpot. Your choice depends upon whether you want to gamble on hitting an occasional home run when everything works out perfectly for a single variety/hybrid, or if you want a little downside protection and are willing to settle for a single every at bat**.**